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MEAT INDUSTRY

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MAGAZINE

SPECIAL PORTION CONTROL FEATURES

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Freezing Patties 24

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A steak looks quite different magnified 13,000 times.

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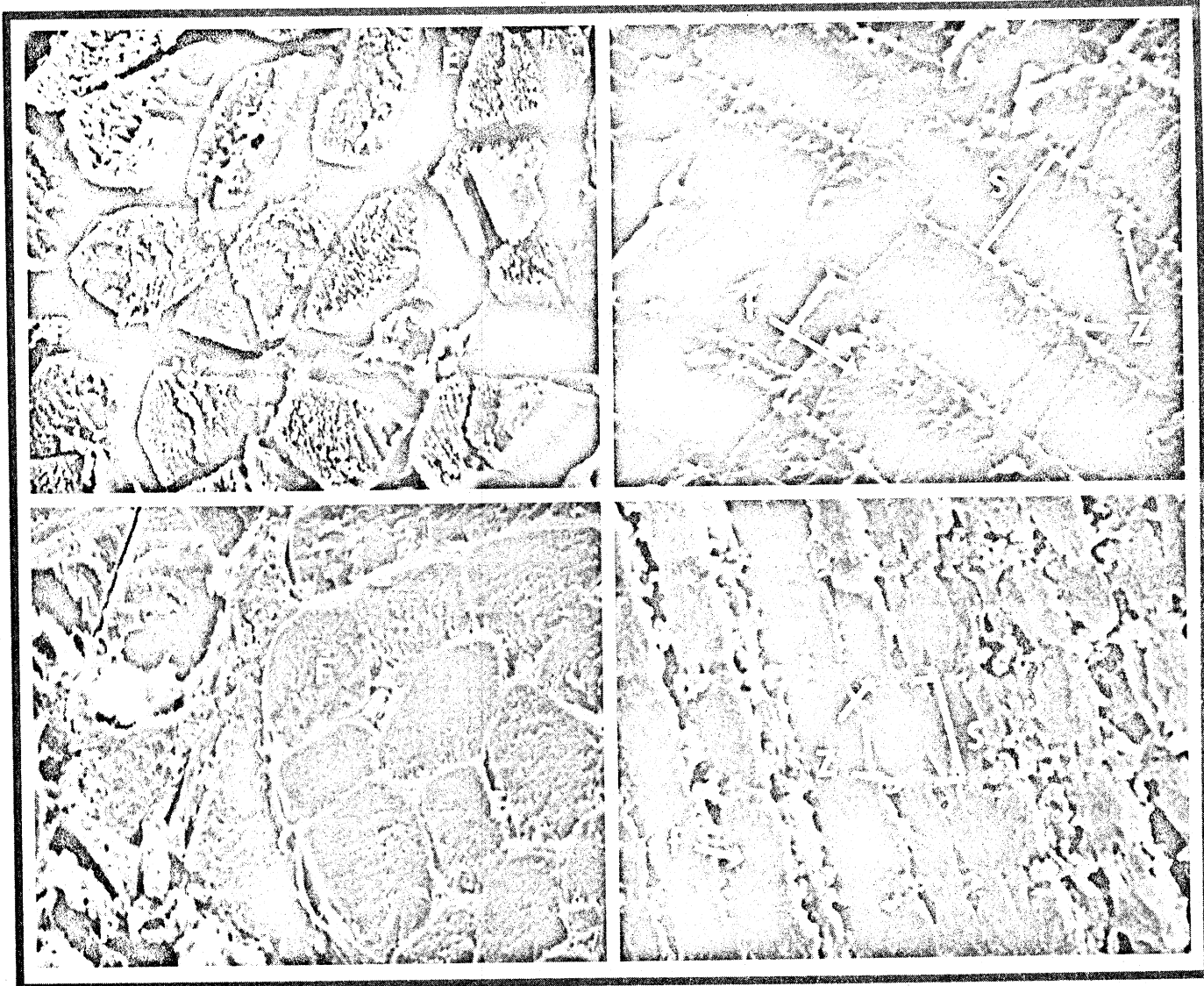
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COVER



Cover photo courtesy of Swift & Co.

A RARE GLIMPSE INTO MEAT STRUCTURE



Scanning electron microscope aids search for way to predict tenderness in meat

THESE AMAZING magnifications of uncooked and "well done" eye of the round reveal something we look at everyday but never see — the ultra-structure of meat. These muscle tissue components can only be seen here because they have been increased in size about 400 times (pictures on left) and about 13,000 times (pictures on right).

The pictures were produced with a scanning electron microscope which is an essential tool in researchers' efforts to find reliable methods for predicting the degree of toughness or tenderness in meat after rigor mortis has stabilized its structure.

The picture of uncooked round in

the upper left shows how muscle tissue is made up of fibers (F) loosely surrounded by sheath-like connective tissues (E) and how these fibers are grouped in bundles which are separated by connective tissue (P).

The tissue contributes both to the strength of the muscle and toughness of the meat. The effect of heat can be seen in the lower left picture where connective tissue in "well done" round has shrunk substantially.

An even deeper examination is provided by the pictures on the right of fibrils (F), the next lower order of organization. Fibrils are more clearly outlined in the bottom right

picture where heat has caused them to separate. It is also easier to see here that a fibril is made up of a string of connected (Z) sarcomeres (S) which are the basic unit of muscle structure. □

This article is based on information and pictures provided by Robert J. Carroll and F. P. Rorer of the USDA Eastern Regional Research Center in Philadelphia, and they acknowledge contributions of S. B. Jones, R. D. Zabarsky and J. R. Cavanaugh. Their research seeks to provide reliable methods for predicting the degree of toughness or tenderness in meat.